methods of producing POSS systems suitable for functionalization and subsequent polymerization or grafting reactions. This oversight in the prior art is reflective of the fact that the invention of POSS-based reagents, monomers and polymer technology has only recently been developed and consequently post-dates this prior art. Hence POSS compositions and processes relevant to the types of systems desired for POSS monomer/polymer technology were not envisioned in the prior art. Additionally the prior art does not demonstrate the action of bases on silane, silicate, or silsesquioxane feedstocks suitable for producing low-cost and high purity POSS systems.

Please replace the paragraph beginning at page 9, line 1, with the following rewritten paragraph:

For the above reaction scheme (Scheme 1) the polymeric silsesquioxane resin is converted into either POSS fragments or nanostructured POSS cage species depending on the type of base and conditions employed. The conversion of polysilsesquioxanes $[RSiO_{1.5}]_\infty$ to POSS-species (homoleptic $[(RSiO_{1.5})_n]_{\Sigma\#}$, functionalized homoleptic $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\Sigma\#}$, heteroleptic $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\Sigma\#}$ and functionalized heteroleptic $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})_p]_{\Sigma\#}$) or into POSS-fragments $[(RXSiO_{1.5})_n]$ can be selectively controlled through manipulation of the process variables discussed above. The process can be conducted using a polysilsesquioxane resin which may contain only one type of R group to produce homoleptic $[(RSiO_{1.5})_n]_{\Sigma\#}$ products. Alternatively the process can be carried out using polysilsesquioxane resins containing more than one type of R group or with mixtures of polysilsesquioxanes in which each contains different R groups to afford heteroleptic $[(RSiO_{1.5})_m(R'SiO_{1.5})_n]_{\Sigma\#}$ products. For the above reaction scheme (Scheme 1) in which mixtures of homoleptic POSS cages (i.e. R of one POSS cage $\neq$ R of the second POSS cage) are substituted for the polysilsesquioxane resin the process effectively converts mixtures of homoleptically substituted POSS cages into heteroleptic POSS cages (functionalized and nonfunctionalized) that contain statistical distributions of different R groups per cage. In most cases the POSS fragments and various homo or heteroleptic nanostructured POSS species can be

D2

separated from one another through crystallization, or extractions by utilizing the differences in solubility between the reaction products and the starting silsesquioxane.

Please replace the paragraph beginning at page 11, line 27, with the following rewritten paragraph:

D3

Scheme 3 illustrates actual reactions that use the conditions described in Process II as proof that the bases and conditions described in Process II are effective for the conversion of functionalized POSS cages (i.e. $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]_{\Sigma\#}$ and $[(RSiO_{1.5})_m(R'SiO_{1.5})_n(RXSiO_{1.0})_p]_{\Sigma\#}$) to desired POSS structures. It should also be noted that in most cases this process results in an increase in the number of functionalities (X) on a POSS nanostructure while at the same time maintaining the original number of silicon atoms contained within the starting nanostructural framework. This can be desirable for a variety of subsequent synthetic product manipulations and derivations.

In the Claims

Cancel claims 8-21, 33-45, 73-85, 99-113, 117, 119-120, 122, and 134.

D4

22. (Twice amended) A process of converting a polymeric silsesquioxane into a POSS fragment, comprising:

mixing an effective amount of a base with the polymeric silsesquioxane in a solvent to produce a basic reaction mixture, the base reacting with the polymeric silsesquioxane to produce the POSS fragment,

wherein the polymeric silsesquioxane has the formula $[RSiO_{1.5}]_\infty$, and the POSS fragment has the formula $[(RSiO_{1.5})_m(RXSiO_{1.0})_n]$, where R represents an organic substituent, X represents a functionality substituent, ∞ represents the degree of polymerization and is a number greater than or equal to 1, and m and n represent the stoichiometry of the formula.

D5

29. (Once amended) The process of claim 28, wherein the base is selected from the group consisting of hydroxide $[OH]^-$, organic alkoxides $[R''O]^-$, carboxylates $[R''COO]^-$, amides